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# **Analytical study of broadband second harmonic generation by total internal reflection-quasi phase matching using the concept of highly multimodal nonlinear guided wave approach in a tapered isotropic slab of Zinc Telluride crystal**

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## **Abstract**

This paper analytically describes the concept of highly multimodal non-linear guided wave approach instead of plane wave optics for explaining broadband second harmonic generation in the mid-infrared region in an isotropic tapered semiconductor slab for ppp-polarization. A computer aided simulation has been carried out to determine the possible efficiency of the second harmonic generation as they undergo total internal reflection quasi phase matching (TIR-QPM) inside the tapered isotropic semiconductor crystal slab made of Zinc Telluride (ZnTe), after considering the absorption, reflection losses and Goos-Hänchen shift within the crystal.

**Keywords:** Second harmonic generation, tapered slab, zinc telluride, modes, non-linear guided wave theory

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